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Notes on synonymy within the genus *Priotrochus* Fischer, 1879 (Prosobranchia: Trochidae)

by

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ABSTRACT

Turbo trochoides Reeve, 1848, *Priotrochus sepulchralis* Melvill, 1899, and *Trochus nabataeus* Issel, 1869, are synonymised with *Priotrochus obscurus* (Wood, 1828). An additional synonym, *Trochus signatus* Jonas, 1844, is also discussed.

Trochus (Aphanotrochus) chrysolaemus von Martens, 1880, is synonymised with *Trochus goudoti* Fischer, 1878, and *Monodonta quadrasi* Sowerby, 1899, with *Thalotia tricingulata* A. Adams, 1853.

Lectotypes designated and figured: *Trochus obscurus* Wood, 1828; *Priotrochus sepulchralis* Melvill, 1899; *Thalotia tricingulata* A. Adams, 1853.

Other type material figured: Holotype – *Turbo trochoides* Reeve, 1848; holotype – *Trochus (Aphanotrochus) chrysolaemus* von Martens, 1880; holotype – *Trochus goudoti* Fischer, 1878; holotype – *Monodonta quadrasi* Sowerby, 1899.

Durban Bay is selected as type locality for *Trochus obscurus* Wood, 1828.

Trochus bicinctus Philippi, 1849, and *Trochus satorius* Deshayes, 1863, are regarded as *nomina dubia*.

INTRODUCTION

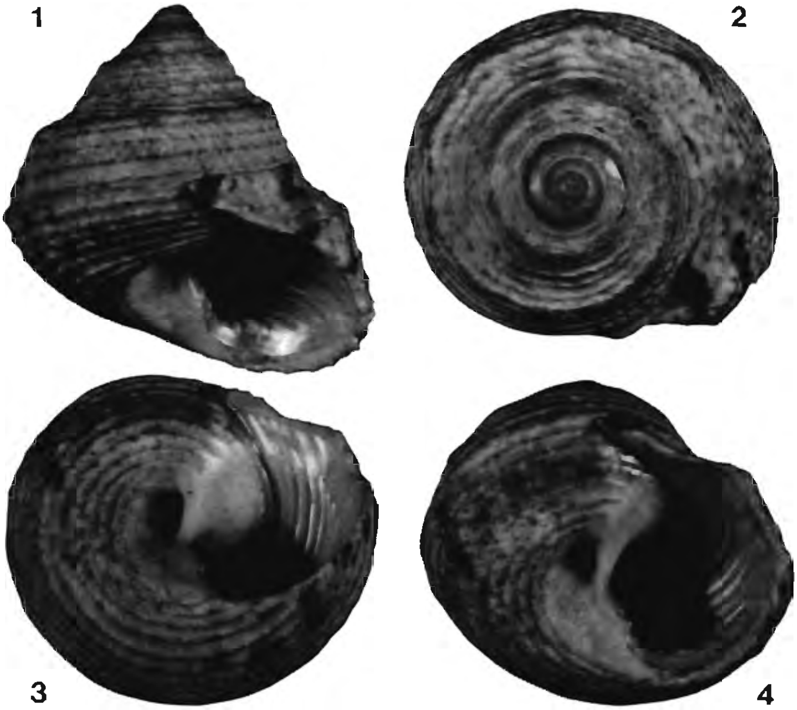
Priotrochus obscurus (Wood, 1828) is a widely distributed and relatively common species around mid-tide level in sheltered, lagoonal environments on the East African coast and in the Red Sea (Herbert 1988 1994). During the course of on-going studies on the Trochidae of the Indo-West Pacific it has become apparent that the species has been described as new on a number of occasions subsequent to Wood's description and these more recent names must therefore be relegated to the synonymy. I take this opportunity also to discuss two other nominate *Priotrochus* taxa from the western Indian Ocean and the enigmatic *Trochus bicinctus* Philippi, 1849. The Pleistocene *Priotrochus obscurus ponsonbyi* (Sowerby, 1888) is not dealt with and all subsequent references to *P. obscurus* refer to the nominate subspecies.

PRIOTROCHUS OBSCURUS (WOOD, 1828)

Trochus obscurus Wood, 1828

Figs 1–4.

Trochus obscurus Wood, 1828:17, pl. 5, fig. 6. Type loc.: Durban Bay (designated herein).
Trochus signatus Jonas, 1844:171 (see below).
Turbo trochoides Reeve, 1848: pl. 12, fig. 58 (see below). **Syn. n.**
Trochus lineolatus Bianconi, 1865:524, pl. 1; Bonfitto, Sabelli, Tommasini & Herbert, 1994:137, fig.6. Type loc.: Mozambique.
Trochus nabataeus Issel, 1869:299, pl. 5, fig. 11 (see below). **Syn. n.**
Priotrochus sepulchralis Melvill, 1899:96, pl. 2, fig. 6 (see below). **Syn. n.**
Priotrochus obscurus; Herbert, 1988 (for further references).



Figs 1–4. *Priotrochus obscurus* (Wood, 1828). Lectotype of *Trochus obscurus* Wood, 1828 (BMNH), height 15.2 mm.

Four syntypes of *Trochus obscurus* Wood, 1828, have recently been recognised in the BMNH (reg. no. 1992178) by Ms K. Way of that institution. One closely resembles Wood's figure of the species in shape and colour, and I here designate it lectotype (Figs 1–4). The specimen is subadult and retains an open umbilicus; considering its age, it is in remarkably good condition and the nacre remains iridescent. Of the other three specimens, one is adult, but all are in poor condition.

The provenance of the original material was unknown and Krauss (1848) was the first author to provide locality data for the species, citing '*Natalküste*'. In fact the only locality on the Natal coast at which it has been known to occur is Durban Bay and I designate this the type locality of the species.

Priotrochus sepulchralis Melvill, 1899

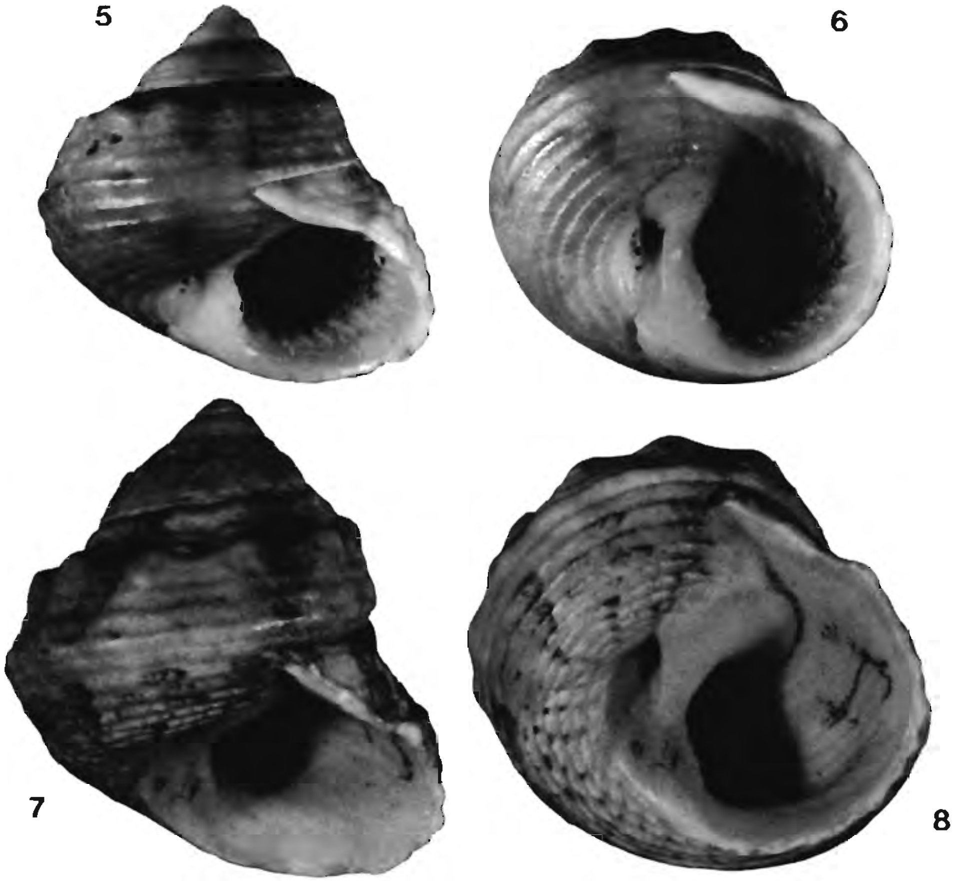
Figs 5–6.

Priotrochus sepulchralis Melvill, 1899:96, pl. 2, fig. 6. Type loc.: Kais Is. (= Jazireh-ye Qeys), off Iran, Persian Gulf; 9 fathoms, coral sand (Townsend).

Gibbula (Priotrochus) sepulchralis; Lamy, 1905:268; *idem*, 1938:81.

Gibbula sepulchralis; Mastaller, 1979:31.

Two syntypes of *Priotrochus sepulchralis* are present in the BMNH (No 1899.12.18.30–1). One, marked 'X', is the figured specimen and it is here refigured



Figs 5–8. *Priotrochus obscurus* (Wood, 1828). 5–6. Lectotype of *Priotrochus sepulchralis* Melvill, 1899 (BMNH), height 10.8 mm. 7–8. Holotype of *Turbo trochoides* Reeve, 1848 (BMNH), height 20.8 mm.

and designated lectotype (Figs 5–6). It is simply an old and faded specimen of *P. obscurus* and I here place Melvill's *sepulchralis* in synonymy with the older *obscurus*. A further three syntypes (now paralectotypes) are present in the HUJI (No 37768). All the types are juvenile and thus rather more depressed than is typical of *P. obscurus*, but they clearly show columella denticles and spiral ridges inside the outer lip. They differ from *Priotrochus aniesae* Moolenbeek & Dekker, 1992, from Oman, in lacking peripheral coronation and spiral ridges on the parietal region.

The type locality given for this species is troublesome. I have personally seen no *P. obscurus* from the Persian Gulf, where it is evidently replaced by *Osilinus kotschyi* (Philippi, 1849) (Herbert 1994), and yet the type material is clearly *obscurus* rather than *kotschyi*. However, assuming there to be a planktonic stage in the development of the species (currently unknown), it is quite possible that *P. obscurus* larvae spawned in the Gulf of Oman may sometimes be carried into the eastern portion of the Persian Gulf (where lies Kais Island, the type locality of *P. sepulchralis*). The absence of additional *P. obscurus* material from the Persian Gulf in the museum collections that I have seen would indicate that the species is rare in that area. It is also possible, as suggested by the subfossil appearance of the type specimens of *P. sepulchralis*, that *P. obscurus* was once an inhabitant of the Persian Gulf, but has subsequently become extinct there.

Turbo trochoides Reeve, 1848

Figs 7–8.

Turbo trochoides Reeve, 1848*a* (April): pl. 12, fig. 58; *idem*, 1848*b* (December):50; Philippi, 1850, in 1842–52:82, pl. 19, fig. 4; Fischer, 1873:37, pl. 36, fig. 4; Sowerby, 1886:200, No 30, pl. 7, fig. 67; Pilsbry, 1888:207, pl. 39a, fig. 34. Type loc.: unknown.

The holotype of *Turbo trochoides* is in the BMNH (No 1874.12.11.174) and is here refigured (Figs 7–8). The major monographers of the last century added little to our knowledge of this taxon, merely repeating Reeve's original description and his comment that the species exhibited many of the characters of a *Trochus*. The holotype is a typical adult specimen of *Priotrochus obscurus* and I here place *T. trochoides* in the synonymy of *P. obscurus*. Presumably it was the turbiniform shape and thick shell that led Reeve to refer the taxon to *Turbo*.

Trochus nabataeus Issel, 1869

Fig. 9.

Trochus nabataeus Issel, 1869:299, pl. 5, fig. 11; Hall & Standen, 1907:67. Type loc.: Raised beach, Red Sea.

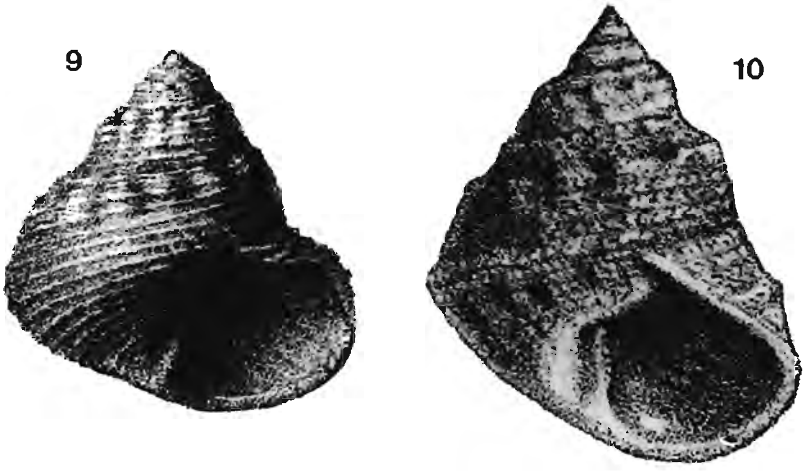


Fig. 9–10. *Priotrochus obscurus* (Wood, 1828). **9**. Original figure of *Trochus nabataeus* Issel, 1869. **10**. Philippi's *Abbildungen* figure of *Trochus obscurus*, almost certainly drawn from Jonas' material of *Trochus signatus* Jonas, 1844.

Issel stated that the original specimen was in the 'Museo di Pisa'. I have been unable to establish whether this is still the case. There is no material of the taxon in ether the MCSN or the University of Pavia, both of which hold original Issel material (Doria *in lit.*, Galeotti *in lit.*). I have seen numerous juvenile specimens of *P. obscurus* from the Red Sea in other museum collections, many of which closely resemble the description and figure of *T. nabataeus* (see Fig. 9) and were in fact often identified as that species. Even without having seen Issel's original material, I have no hesitation in synonymising *Trochus nabataeus* with *Priotrochus obscurus*.

Trochus signatus Jonas, 1844

Fig. 10.

Trochus signatus Jonas, 1844:171; Philippi, 1845, in 1842–50:26 (14), pl. 6(5), fig. 3 (as *obscurus*); Pilsbry, 1889:258. Type loc.: unknown.

Jonas provided no illustration of his new species and I have been unable to trace his type material. Philippi, in his Abbildungen (Philippi, 1845, in 1842–50), regarded it as a synonym of *Priotrochus obscurus* and, when dealing with the latter name, simply repeated Jonas' description of, and remarks on *signatus*. In this same work Philippi provided a figure which I take to be representative of *T. signatus*, although it cannot be proven that this was drawn from Jonas' material (see Fig. 10). As there was no mention of Krauss' material of *P. obscurus* from Natal it is evident that Philippi was not then aware of its existence and thus it could not have formed the basis of his illustration, nor was this a reproduction of Wood's figure of *obscurus* which represented a subadult specimen.

The Philippi figure is good and clearly represents an adult example of *P. obscurus*. The spiral ridges inside the outer lip and the fine columella denticles (features which distinguish *P. obscurus* from similar species such as *Osilinus kotschyi* (Philippi, 1849) (Herbert, 1988 and in press)) are mentioned in Jonas's description and shown in Philippi's figure. Whilst acknowledging that the original material has not been examined for confirmation (if still extant), I follow Philippi and accept the synonymy.

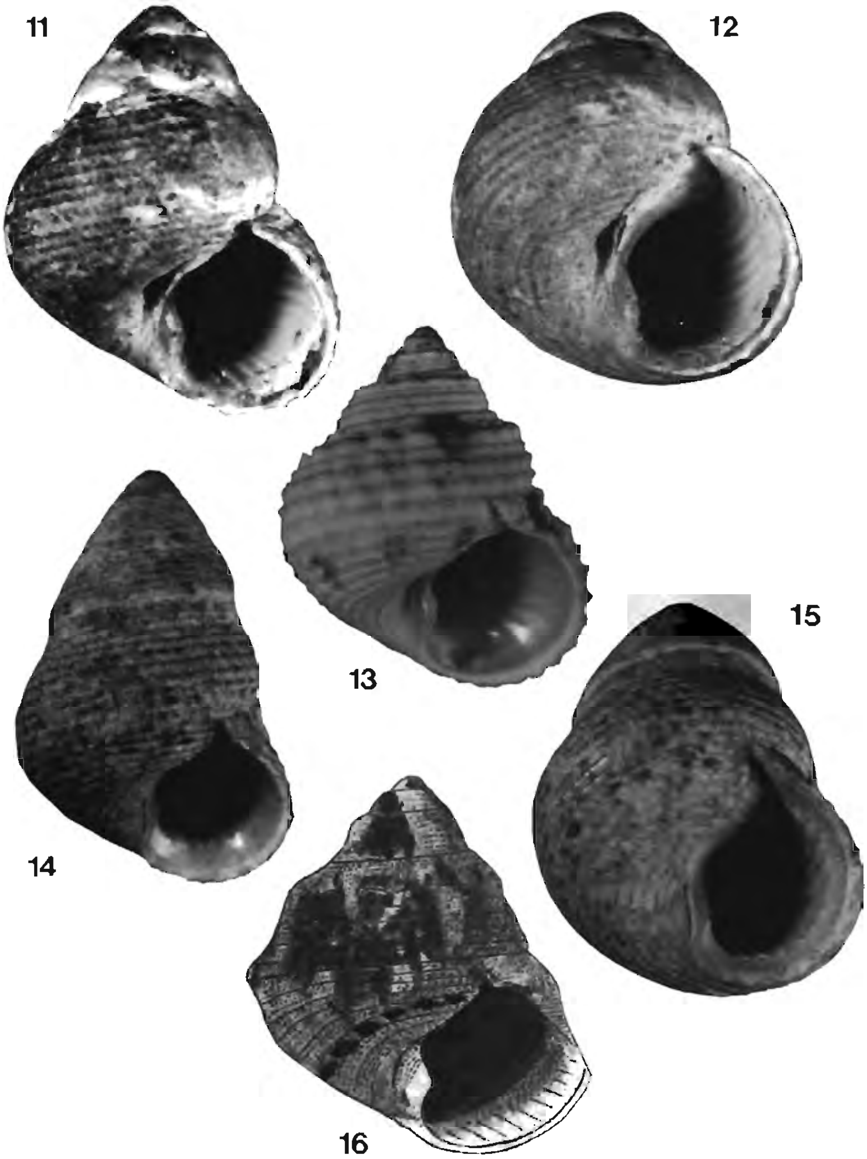
PRIOTROCHUS GOUDOTI (FISCHER, 1878)

Trochus (Aphanotrochus) chrysolaemus von Martens, 1880

Figs 11–12.

Trochus (Aphanotrochus) chrysolaemus von Martens, 1880:296, pl. 20, fig. 20. Type loc.: Black River, Mauritius.
Monilea (Priotrochus) chrysolaema; Pilsbry, 1889:258, pl. 39, fig. 27.
Priotrochus chrysolaemus; Viader, 1937:55.
Monilea chrysolaemus; Michel, 1974:215.

The holotype (Figs 11–12) is in the ZMHB and in poor condition. I have compared fresh specimens of *T. chrysolaemus* material from Mauritius with the type material of *Trochus goudoti* Fischer, 1878 (MNHN), from 'Sainte-Marie de Madagascar' (= Nosy Boraha Is.), off the east coast of Madagascar, and consider them to be conspecific. Although the holotype of *T. goudoti* is noticeably more elevated than typical specimens of *T. chrysolaemus* and lacks an umbilicus (compare Figs 11–12 with 14–15), the sculpture, colour pattern and apertural dentition are very similar and I have seen many specimens of intermediate height with a narrow or very nearly occluded umbilicus. I believe that these represent opposite ends of a graded series in a morphologically variable species, and I therefore propose that the name *Trochus chrysolaemus* be synonymised with the older *T. goudoti*.



Figs 11–16. *Priotrochus goudoti* (Fischer, 1878) and *Trochus bicinctus* Philippi, 1849. **11–12**. Holotype of *Trochus (Aphanotrochus) chrysolaemus* von Martens, 1880, ZMHB, height 7.1 mm. **13**. Coarsely sculptured specimen from Réunion (NMSA K3034), height 7.5 mm. **14–15**. Holotype of *Trochus goudoti* Fischer, 1878, MNHN, height 8.2 mm. **16**. Philippi's *Conchylien-Cabinet* figure of *Trochus bicinctus* Philippi, 1849.

Trochus goudoti Fischer, 1878

Figs 13–17.

Trochus goudoti Fischer, 1878:62; *idem*, 1878 in 1875–80:371, pl. 113, fig. 3. Type loc.: Sainte-Marie de Madagascar (= Nosy Boraha Is.).
Trochus (Priotrochus) goudoti; Pilsbry, 1889:258, pl. 61, fig. 36.
Trochus (Aphanotrochus) chrysolaemus von Martens, 1880. **Syn. n.**

This is an earlier name for the more widely known *Trochus chrysolaemus* von Martens, 1880, described from Mauritius (see above). The species is variable in colour, patterning and shape, ranging from tall and anomphalous to broad and umbilicate. The inner lip is white in juveniles, frequently becoming yellow or greenish at maturity, soon after the appearance of the columella denticles. Judging from material from the Mascarene Islands, the squatter *chrysolaemus* form is the more common, but insufficient material is available for comment on the Madagascar population.

The majority of specimens are not noticeably shouldered and have a spiral sculpture of relatively close-set, nearly smooth, spiral cords, but some individuals from Réunion (Fig. 13) have a distinct shoulder and possess fewer, more widely spaced cords with well-developed nodules, particularly those near the shoulder. I am uncertain whether these shells simply represent a strongly sculptured form of *P. goudoti* or belong to a distinct and undescribed species. Insufficient material is available.

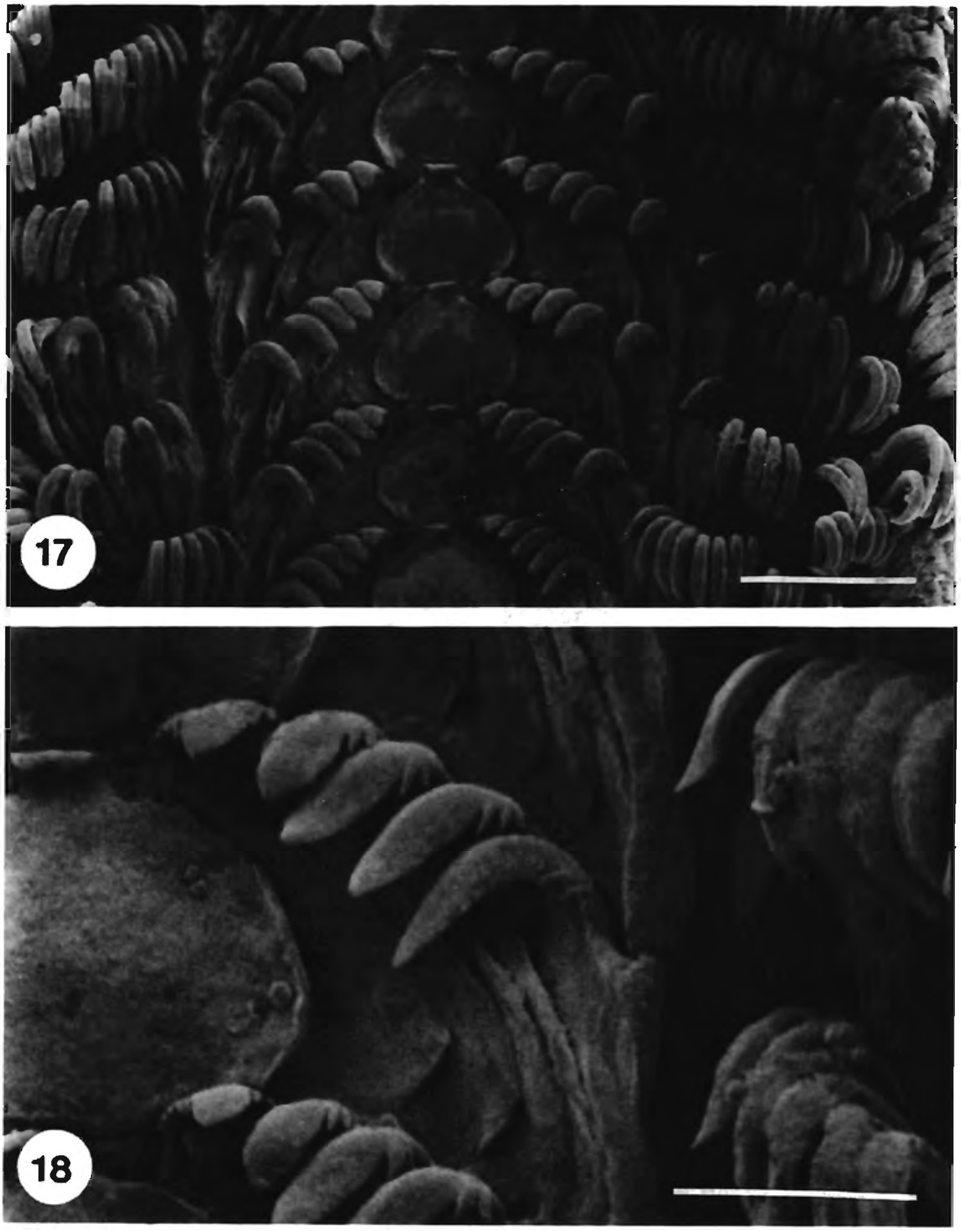
Trochus satorius Deshayes, 1863, described from Réunion, could be an even earlier name for this species. The overall facies of the two taxa are clearly similar and immature specimens of *P. goudoti* not infrequently possess the slight peripheral angulation figured and described in *T. satorius*. However, neither the figure nor the description of *T. satorius* is sufficiently unambiguous such that I can be certain of synonymy. Referral to the original material is not possible since it is not present in the MNHN, the most likely repository, and can be considered lost (Bouchet *in lit.*). I thus consider *Trochus satorius* a *nomen dubium*.

A radula has been extracted from a dried juvenile specimen (Figs 17–18). It is essentially typical of the genus; rachidian cusp much narrower than that of *P. iris* Herbert, 1988, and more like that of *P. obscurus*; it differs from the latter in having 2–3 distinct denticles on the outer basal margins of the lateral tooth cusps. There is nothing in the radula to suggest a closer relationship to *P. iris* than to *P. obscurus* (cf. Herbert, 1988). No well preserved material is available for observations on external anatomy.

Type material: The holotype of *Trochus goudoti* Fischer, 1878, is in the MNHN (Figs 14–15).

Distribution: Madagascar, the Comores and the Mascarene Islands, 0–47 m (living specimens the same); insufficient live-taken material is available to comment on habitat preferences.

Additional locality data: MADAGASCAR: S.E. of Iles Glorieuses, 24 m, Benthedi Exped. (Stn 124), (MNHN); Banc du Geyser, southern part of lagoon, living, 3–8 m, Benthedi Exped. (Stn 117), (MNHN). COMORES: Sandy Is., Mayotte, E. Roscoe (NMSA G3635). MAURITIUS: Pointe Radeau, south of Roches Noires, shell debris



Figs 17–18. *Priotrochus goudoti* (Fischer, 1878), radula (*ex* NMSA K9355), bars = 50 µm and 20 µm respectively.

near reef break, R. Kilburn & D. Herbert (NMSA K9617); Vacoas Point, 3 miles south of Mahébourg, sand and sea grass, basalt shore, 0–1 m, Ostheimer, Blyther & Orr, Stn M225 (ANSP); Riambel lagoon, beach-drift, R. Kilburn & D. Herbert (NMSA K4910, K9757); Pointe Sud-Ouest, south coast of Le Morne peninsula, beach-drift within lagoon, R. Kilburn & D. Herbert (NMSA K8839); Tamarin Bay, lagoon, R. Kilburn & D. Herbert (NMSA K8492); S. E. side of Tamarin Bay, sand flats, sea grass and coral, 0–0.6 m, living, Ostheimer, Blyther & Orr, stn M224 (ANSP); off Trou aux Biches, reef front *ca* 5 m, fine sand, dived D. Herbert (NMSA K8390); off Trou aux Biches, reef front, fine sand, *ca* 10 m, living, dived D. Herbert (NMSA K9355); Mauritius, unlocalised, *ex* P. Elston coll'n (NMSA G575). RÉUNION: Boucan Canot, 47 m, living under stones, dived J. Drivas (NMSA K3034). RODRIGUES: between Anse aux Anglais and Pointe Venus, beach-drift, D. Herbert (NMSA K7814).

TROCHUS BICINCTUS PHILIPPI, 1849

Fig. 16.

Trochus (Phorcus) bicinctus Philippi, 1849:102. Type loc.: Red Sea.
Trochus bicinctus Philippi, 1851, in 1846–55:230, pl. 35, fig. 2; Pilsbry, 1889:474.
not *Trochus (Phorcus) bicinctus*; Issel, 1869 (= *Clanculus gennesi* Fischer, 1901).
not *Euchelus bicinctus*; Shopland, 1902:176; Tillier & Bavay, 1905:176; Tomlin, 1927:298; Moazzo, 1939:207; Spry, 1968:7; Biggs, 1973:350; Glayzer, Glayzer & Smythe, 1984:315, 318; Mastaller, 1978:30 (= *Clanculus gennesi* Fischer, 1901).

Issel (1869) incorrectly identified Savigny's illustration (Savigny 1817, pl. 3, fig. 3) as *Trochus bicinctus* Philippi, 1849, and this has resulted in considerable subsequent confusion. Many specimens in museum collections identified as *bicinctus* (usually under *Clanculus* or *Euchelus*) and many Persian Gulf/Red Sea literature references in fact refer to *Clanculus gennesi* Fischer, 1901, a name based (in part) on Savigny's illustration. Philippi's figure of his *Trochus bicinctus* given in the *Conchylien-Cabinet* (Philippi 1851 in 1846–55), however, is quite different from that given by Savigny (see Pallary 1926), a fact also noted by Fischer (1901).

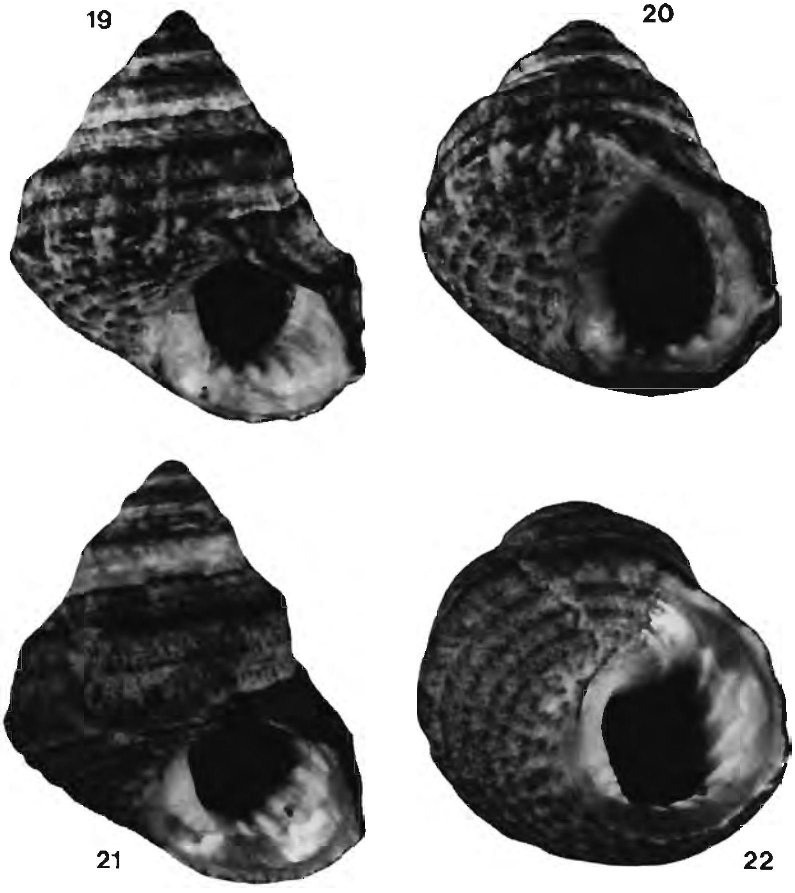
There is no type material of *T. bicinctus* in the ZMHB (personal observation), even though this was cited as the repository ('*im Berliner Museum niedergelegt*' Philippi 1851, in 1846–55). If any is still extant, its most probable repository would be the National Museum of Natural History in Santiago, Chile.

Judging from the description and figure of *T. bicinctus* in the *Conchylien-Cabinet*, there is considerable similarity with *Priotrochus obscurus* and indeed Philippi himself mentioned this, '*Die Gestalt erinnert an* Tr. obscurus *Wood*' (Philippi 1851, in 1846–55:231). However, the specimen described by Philippi was small (height and diameter 3 linie = 7.63 mm) and, at this size, specimens of *P. obscurus* are perhaps less similar to the published figure than are the adults. In addition, there are a number of other smaller-shelled taxa that also show some similarity with *T. bicinctus*, eg. *Gibbula isselii* Caramagna, 1888, also from the Red Sea (itself a species of somewhat dubious validity and of which there is evidently no extant type material), and *Trochus goudoti* Fischer, 1878, from Madagascar and the islands of the south-western Indian Ocean (see above). Philippi's illustration also shows similarity with *Osilinus kotschyi* (Philippi 1849), particularly the profile and columella base; the description, however, stated that the aperture was ribbed internally and that the columella had two small teeth at its base – features more typical of *Priotrochus* species than of *O. kotschyi* (Herbert 1994).

Although I strongly suspect that *T. bicinctus* is a synonym of *P. obscurus*, without examination of the type material of *bicinctus* it is not possible to make a conclusive statement. I have tried to establish whether or not there are any specimens labelled under this name in Philippi's collection in Chile, but without success. Consequently I consider the taxon a *nomen dubium*.

CONCLUSION

In the light of the newly proposed synonyms it is perhaps pertinent to indicate the specifically distinct taxa which belong within *Priotrochus*, viz: *P. obscurus* (Wood, 1828) (Red Sea and East Africa, intertidal), *P. goudoti* (Fischer, 1878) (islands of the south-western Indian Ocean, subtidal), *P. iris* Herbert, 1988 (south-eastern Africa, subtidal), and *P. aniesae* Moolenbeek & Dekker, 1992 (Oman, intertidal).



Figs 19–22. *Austrocochlea tricingulata* (A. Adams, 1853). **19–20.** Lectotype of *Thalotia tricingulata* A. Adams, 1853, (BMNH 196863), diameter 6.8 mm, height 7.6 mm. **21–22.** Holotype of *Monodonta quadrasi* Sowerby, 1899 (BMNH 98.8.29.9), diameter 9.7 mm, height 11.7 mm.

Thalotia tricingulata A. Adams, 1853, an unillustrated and very poorly documented taxon of unknown provenance, is intermediate in form between *Austrocochlea* Fischer, 1885, and *Priotrochus*, and is worthy of further study. Hedley (1913) suggested that *tricingulata* be rejected because the taxon was unrecogniseable, but the BMNH has three probable syntypes (BMNH 196863) which fit the description well and which can be used to define the taxon; one is here figured and designated lectotype (Figs 19–20). *Monodonta quadrasi* Sowerby, 1899, from the Philippines, an almost equally poorly known taxon, is clearly a junior synonym; the holotype (BMNH 98.8.29.9), illustrated for comparison (Figs 21–22), is simply a somewhat larger, more mature specimen. The overall facies of the species is more typical of *Austrocochlea* and I refer it there, noting, however, that there are some weak denticles on the basal portion of the collumella – fewer in number than is typical of *Priotrochus*, but more than is typical of *Austrocochlea*. The central Indo-West Pacific distribution is also intermediate between that of *Priotrochus* (western Indian Ocean) and that of *Austrocochlea* (southern Australia).

ABBREVIATIONS

ANSP — Academy of Natural Sciences, Philadelphia.
BMNH — The Natural History Museum, London.
HUJI — Hebrew University, Jerusalem, Israel.
MCSN — Museo Civico di Storia Naturale di Genova, Italy.
MNHN — Muséum National d'Histoire Naturelle, Paris.
NMSA — Natal Museum, Pietermaritzburg, South Africa.
ZMHB — Museum für Naturkunde der Humboldt-Universität, Berlin.

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